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ARAMINTA ROSS

AUTHOR OF "MIDWIFERY AND GYNÆCOLOGICAL NURSING NOTES"; FORMERLY SISTER IN THE ROTUNDA HOSPITALS, DUBLIN; PRINCIPAL OF THE DUBLIN SCHOOL OF MASSAGE

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PREFACE.

THE following notes have been culled from various classes and lectures attended by the compiler during her training, and are not sent forth as original. Her object in placing them in this form is to save the pupils who are trained at her school an unnecessary waste of time in note-taking.

They are also sent forth in the hope that they may be found helpful to other pupils at the beginning of their training, and not with the idea of lessening the very necessary study of so many important works, of which these notes are but steps. The order of movements will only be of use to pupils trained at the school; but blank leaves have been left for each pupil to fill in the order of movements she has been taught during her training.

A. ROSS.

21 GT. DENMARK STREET,
DUBLIN.

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PART I.

THE HUMAN BODY.

CHAPTER I.

THE BONY SYSTEM.

THE *human body* is made up of a number of individual parts called *organs*, and the structures of which these parts are composed are called the *tissues*.

Each of these organs has its own appointed work to do, which is spoken of as its function. It will be convenient to study the human body under the following heads or systems:—

The Bony or Osseous system.
The Muscular or Contractile system.
The Nervous or Conductile system.
The Blood or Circulatory system.
The Digestive or Alimentary system.
The Absorptive or Lymphatic system.
The Glandular or Excretory system.
The Respiratory or Breathing system.

The *bony system* constitutes the whole skeleton (including the cartilages and ligaments which bind the bones together) and forms a strong framework for the body, as well as a protective covering for the various organs contained in its cavities, and assists in locomotion.

The bones number more than 200, and are connected either perfectly or partially in harmony with the general scheme of the body and the requirements of its individual parts.

The three divisions into which the skeleton has been divided are:—

1. Head.
2. Trunk—subdivided into thorax or chest, and abdomen.
3. Limbs—upper and lower extremities, or arms and legs.

The head consists of two parts, viz. :—

The cranium, which is the bony cavity in which the brain is situated, and the face.

The *bones of the cranium* are eight in number, *viz.* :—

One occipital.
One frontal.
Two temporal.
Two parietal.
One ethmoid.

One sphenoid.

The *bones of the face* are fourteen in number, *viz.* :—

Two superior maxillary.
Two palate.
Two nasal.
Two lachrymal.
Two inferior turbinated.
One vomer.
Two malar.
One inferior maxillary.

Bones of the trunk :—

The spine, or backbone, is composed of thirty-three bones, called vertebræ, placed one on top of the other so as to form a curved column.

Those composing the neck are termed *cervical vertebræ*, and are seven in number.

Next in order are the twelve which go to form the back, and which are called *dorsal vertebræ*.

After these come the five *lumbar vertebræ*, the bones which go to form the loins. Below these again are the five united vertebræ which in adult life form the *sacrum*.

Lastly, there are the four imperfect vertebræ termed the *coccyx*. These are often joined in one.

The normal curves are :—

Cervical region—anterior convexity.

Dorsal region—anterior concavity.

Lumbar region—anterior convexity.

Sacrum region }—anterior concavity.
Coccyx region }

Each vertebra has a body which is anterior, a bony ring cavity which is posterior, and seven processes, *viz.*:—

One spinous process. These form the little projections felt all down the back.

Two transverse processes—one on each side.

Two superior articular processes—on upper surface.

Two inferior articular processes—on lower surface.

The spinous and transverse processes are used for the attachment of muscles, and also limit movement.

The superior and inferior articular processes are those by which the vertebræ are connected with each other. They are also connected by the intervertebral cartilages, which are placed between the bodies of the adjacent vertebræ. These act as buffers, and prevent the bones from coming in contact with each other.

The vertebræ, when jointed, form a long column containing a canal. The latter serves as a protection for the spinal cord and its membranes, the former as an organ of support for the head.

The hole through which the spinal cord enters the canal from the brain is termed the *foramen magnum.*

The openings formed by the joining of the individual bones of the vertebral column are for the purpose of transmitting the spinal nerves, which pass in pairs from the spinal cord.

The bodies of the vertebræ become larger and stronger towards the lower end of the column, as there they have to support more of the weight of the body.

The first two vertebræ are different from all the others, and are called the atlas and axis respectively.

The *atlas* is the top bone of the cervical vertebræ on which the head rests. The head articulates by its condyles, and is attached by ligaments to the two articular surfaces on each side of the atlas. The atlas has no body, but an anterior and posterior arch, and no spinous process.

The *axis* is the second bone. It has a very strong peg on its upper surface, called the odontoid peg, that forms a pivot on which the atlas turns when the head is moved from side to side.

The remaining *cervical vertebræ* differ from the other vertebræ in that they have much smaller bodies and larger openings; their spinous processes are short and divided; and their transverse processes have apertures through which the vertebral arteries pass.

In the *dorsal vertebræ* the bodies become larger, and the arches smaller. On each side of the body is a facet, or articulating surface, with which the head of a rib articulates. On each transverse process also there is a facet with which the tubercle of the rib articulates. Their spinous processes are long and lie rather obliquely.

The bodies of the *lumbar vertebræ* are still larger and stronger, the arches intermediate in size, and the spinous processes are placed horizontally.

The *pelvis* is a bony basin, situated at the lower end of the spine. It is composed of the two ossa innominata, the sacrum and the coccyx.

The *false pelvis* is the expanded upper portion which is bounded in front by the abdominal walls, and the part below is termed the *true pelvis* as it is bounded in front by the pubis.

The *ilio-pectineal line* is the boundary line which marks the true from the false pelvis.

In childhood each os innominatum is divided into three bones, *viz.* :—

The ilium.
The ischium.
The pubis.

The *ilium* is the expanded upper part, sometimes called the flank. Its inner surface has a depression, which is called the iliac fossa. Its upper edge is called the crest.

The crest has two spines in front, the upper being called the anterior-superior, and the lower the anterior-inferior spine; also two posterior spines — a posterior-superior, and a posterior-inferior.

The *ischium* is the lower portion and back part of the innominatum bone.

Its projection is called the tuberosity, which is the part on which we sit. It has also a thin edge which is termed the ascending ramus.

The *pubis* is made up of a thick portion and two branches, called the descending and horizontal rami respectively.

The horizontal ramus assists with the ilium and ischium in the formation of the acetabulum, which is a large round depression into which the head of the femur fits.

The pelvis has two notches, which lie at the back, below the posterior-inferior spine, and are called the greater and lesser *sacro-sciatic notches.*

The *obturator foramen* is a large aperture in front of the acetabulum. It is nearly completely covered by membrane, and transmits the obturator nerve and blood-vessels.

The *ribs* form a bony framework for the chest, and number in all twelve pairs.

Of these seven pairs on each side are called *true,* and five on each side are called *false.*

The seven true ribs are attached by their articular surfaces to the upper seven dorsal vertebræ, and in front by cartilage to the sternum.

Three of the five false ribs are attached to each other by a substance called cartilage, or gristle, and the remaining two are called *floating ribs,* and are attached only to the back and not to each other.

Between the ribs are the intercostal muscles.

The *sternum,* or breast bone, is the long straight bone lying in the middle of the chest, and to which the seven true ribs are attached by cartilage. It also articulates with the inner end of the clavicle at its superior extremity. Its lower end terminates in the ensiform cartilage.

BONES OF THE LIMBS.

The *clavicle*, commonly known as the collar-bone, is shaped somewhat like the letter S. It articulates with the sternum at its inner end, which is the round knobby portion; and with the acromion process of the scapula at its outer extremity.

It is by this bone that the upper arm and scapula are kept from falling forwards, which happens when fracture of the clavicle occurs.

The *scapula*, or shoulder blade, is a rather flat, triangular-shaped bone, which lies at the back of the ribs, and forms a protection for the chest cavity from behind.

Being triangular it has three borders, three angles, and three processes.

The *borders* are called :—

Posterior, or vertebral border.

Anterior, or axillary border.

Superior, or upper border.

The processes are :—

1. The acromion process, which is on the outer side of the bone, and on which is an articular surface for the outer end of the clavicle.

2. The coracoid process, which serves as a medium for the attachment of muscles, and

with the acromion forms a protection for the shoulder joint.

3. The projection crossing the spine is called the spine of the scapula, the depressions above and below being called the supra- and infra-spinous fossæ.

Below the acromion and coracoid processes is a cavity called the glenoid cavity, which is very shallow, but is deepened by cartilage. Into this cavity the head of the humerus fits.

The *humerus* is the long bone of the upper arm. It is very strong.

The parts of the bone are:—

The head with its two necks and two tuberosities, the shaft and lower extremity.

The head resembles a half circle, and fits into the glenoid cavity, forming a ball and socket joint.

The necks are called the anatomical and surgical respectively. The former is just below the head of the humerus, which is kept in position by a ligament called the capsular ligament, which binds it to the glenoid cavity. The surgical neck is the part just below the tuberosities.

There are two tuberosities at its upper end, the outside being called the greater tuberosity, and the inner the lesser tuberosity. On the top of the outer tuberosity are three facets for the attachment of muscles.

The depression between the two tuberosities is called the bicipital groove.

The shaft is the long part of the bone, which lies between the two extremities.

The lower end, or extremity, has two condyles, and two articulating surfaces; the inner for the ulna, and the outer for the radius.

At the back, and above the articulating surface, or trochlea, as it is termed, is a depression called the olecranon fossa, into which the olecranon process fits; and in front is another depression called the coronoid fossa, into which the coronoid process of the ulna fits.

The *radius* is the outer bone of the forearm. Its head is round, and it articulates with the outer articulating surface of the humerus and with the ulna.

Just below the head on the inner side is the tubercle, which serves as a means of attachment for the biceps muscle.

The shaft is thinner towards its inner surface to which the interosseous membrane is attached, and is much larger at its lower extremity than at its head. The inner side of the lower extremity has a small cavity, termed the sigmoid cavity, and at this point articulates with the ulna. At the outer side is a projection called the styloid process, while its lower aspect has a flat articular surface for the two wrist bones, the scaphoid and semilunar.

The *ulna*, which is the inner bone of the forearm, has at its upper end a large depression called the greater sigmoid cavity, and into this the articulating surface of the humerus fits, forming the hinge joint of the elbow. There is a smaller cavity just below, called the lesser sigmoid cavity. This serves as an articulating surface for the head of the radius, which glides round the ulna when the hand is turned with the palm upwards or downwards.

There are also two projections at the top, bounding the greater sigmoid cavity, the front being called the coronoid process, and the one behind being called the olecranon process.

Around the radius, at the upper extremity, is a ligament, called the orbicular ligament, which serves to keep the bone in position against the ulna, whilst permitting its free movement round that bone.

The shaft is thinner towards its outer surface, and has attached to it the interosseous membrane for the origin of various muscles.

At the lower end of the ulna is a projection called the styloid process.

The *carpal* or wrist *bones* are eight in number. They are placed in two rows, and joined together by the anterior and posterior ligaments. In the first row are the scaphoid and semi-lunar, which articulate with the radius; and the cuneiform and pisiform, which do not articulate with the arm bones. In the second row are the trapezium, trapezoid, os magnum and unciform. These articulate with the metacarpal bones.

The *metacarpal bones*, which are five in number, go to form the palm of the hand, and articulate at their lower extremity with the first set of phalanges.

The *phalanges*, or finger bones, are fourteen in number, and articulate with each other. There are two in each thumb and three in each finger.

The *femur*, or upper leg bone, is somewhat like the humerus in formation, only much larger and stronger than any other bone in the body.

The head is quite round, and fits into the acetabulum, forming a ball and socket joint. It is kept almost entirely in position by a ligament, called the ligament teres, which is attached to its head, and by the capsular ligament.

The neck is the portion lying somewhat obliquely between the head and the shaft.

Below the neck there are two prominences, one on the outer side and one on the inner. They are termed the greater and lesser trochanters respectively; and it is to these prominences certain muscles are attached.

The shaft is cylindrical. At the back it has a rough line extending down its whole length, which is termed the linea aspera.

The lower end, or extremity, has two processes, termed outer and inner tuberosities, and below these again are the outer and inner condyles. Between these two condyles are placed two short ligaments, called the crucial ligaments, which cross each other, and serve to prevent the leg from being bent too far backwards or forwards.

The *patella*, or kneecap, is the small bone placed over the joint of the femur and tibia. It is somewhat triangular in shape, and has two surfaces for articulating with the femur, the outer being the larger. It is kept in position by the ligamentum patellæ, which is an extension of the tendon which brings the four large extensor muscles of the leg to the knee.

The *tibia*, or shin bone, is the inner bone of the lower leg. It has two surfaces at its upper end for articulation with the femur. There is a small rough eminence lying between these surfaces, termed the spine, which gives attachment to the crucial ligaments.

There are also placed between the femur and the tibia little pads of cartilage, which serve as buffers, thus preventing the bones from coming in contact with each other. At the back of the outer tuberosity is an articulating surface for the head of the fibula, and in front a rough eminence called the anterior tuberosity to which the ligamentum patellæ is attached.

The shaft is narrow in the middle, but broadens at each end. It is the shape of a triangle, and therefore has three borders and three angles.

At its lower end is a projection called the inner malleolus, which forms the inner ankle, and below a flat surface for articulation with the bone, called the astragalus.

The *fibula* is the outer bone of the leg, and in formation is very much slighter than the tibia.

At its head is a process called the styloid process, inside which there is a smooth surface for articulating with the tibia.

The shaft is straight, and like the radius and ulna there is an interosseous membrane placed between it and the tibia for the attachment of muscles. The lower end of the shaft becomes larger, and the outer surface is called the external malleolus, forming the outer ankle. It articulates with the tibia on its inner side, and below with the astragalus bone.

The *tarsal* or heel bones are seven in number, *viz.* :—

Os calcis.
Astragalus.
Cuboid.
Scaphoid.
Inner, middle and outer cuneiform.

These articulate with one another.

The *metatarsal* or foot bones are five in number, and correspond with the bones of the palm of the hand. They articulate with the tarsal bones at their posterior ends, and with the first row of phalanges at their anterior ends.

The *phalanges* or toes number fourteen, and correspond with the phalanges of the fingers, two in each great toe, and three in each of the other toes.

CHAPTER II.

POSITION OF THE VARIOUS ORGANS PROTECTED BY THE SKELETON.

THE skeleton not only forms a framework for the muscles, but it is also constructed to contain, and give protection to, the more delicate organs which are situated in its cavities.

The *brain* is encased in the bony box called the skull. It is the organ of all thought, sensation and emotion, of muscular movement, and the seat of the five senses.

The part of the brain box in which the brain is situated is called the cranium.

The face, which is the remaining portion, contains the organs of sight, taste and mastication.

The *neck* is supported by the cervical vertebræ, and in it are the larynx and organ of voice. It also contains several large blood-vessels and the œsophagus.

The *trachea* is a long stout pipe, leading from the back of the mouth and nose—called the pharynx—into the thorax.

It is protected by cartilaginous rings, and at the lower end divides into two branches, sending one into the right lung and one into the left.

These branches are called bronchi, the bronchi and trachea thus forming part of the air-passage which leads to the lungs.

The *gullet*, also called the food pipe, is a long pipe, passing from the back of the throat through an aperture in the diaphragm to the stomach.

The *epiglottis* is a small lid which falls over the opening of the larynx, and thus prevents the food from passing down into the air passages; but it permits of its passing over the trachea, and on to the œsophagus.

The *diaphragm* is a large flat muscle which divides the trunk of the body into two compartments, *viz.*, the thorax and abdomen.

It is formed like an arch, with the concavity looking towards the abdomen.

It is attached to the ribs and spine, and greatly aids in the movement of respiration, as when it contracts, it draws the upper part of its arch downwards, and thus enlarges the thoracic cavity. This allows more room for the lungs to expand, as they lie above it.

When the contraction of the muscle ceases, the diaphragm rises again, forming an arch, and helping to expel the air from the lungs.

The *lungs* are two spongy, pink-looking organs, occupying the greater portion of the thoracic cavity. They are excretory organs. Their function is to purify the blood from poisonous matter collected whilst passing through the body. They also supply the blood with oxygen from the air around them.

The *pleura* is a kind of double sac in which the lungs are contained, and lining the wall of the thorax.

The *heart* is contained in the cavity of the thorax, lying in a central position, slightly to the left, and is on an average the size of its owner's fist.

The base is the widened upper part, and the apex the lower, which is situated about one inch below the left nipple. It is a hollow muscular organ, its function being to pump pure blood throughout the entire system by means of vessels called arteries and capillaries, and to receive back impure blood by veins.

ABDOMINAL ORGANS.

The *liver* is a dark, reddish-brown organ situated immediately underneath the diaphragm to the right. One of its most important functions is the secretion of the bile, which aids in the process of digestion.

The *gall bladder* lies under the right side of the liver. It is a small bag into which the bile flows as it is secreted, and in which it is stored up until required for digestive purposes.

The *stomach* lies to the left of the middle line. and directly under the diaphragm and under the left side of the liver. It is a large bag composed of muscle, and is the principal organ of digestion. It has two openings, one called the cardiac orifice, which leads from the œsophagus, and the other the pyloric orifice which opens into the small intestines.

The *intestines* are composed of two distinct parts, namely, the small and large intestine.

The *small intestine*, which is a twisted tube, measuring about twenty feet in length, consists of three parts, namely, the duodenum, jejunum and the ileum. It opens into the large intestine by the ileocæcal valve.

The *large intestine*, which is much wider, and about six feet in length, is divided into three parts, *viz.*, the cæcum, colon and rectum.

The colon in its arrangement is like three sides of a square termed the ascending, transverse and descending colon. It then forms into a badly shaped S, which is called the sigmoid flexure.

The *rectum*. which ends in the external opening, or anus, forms the lower portion of the bowel.

The *spleen*, which is a dark purple-grey organ, lies to the left of the stomach and is easily injured. Its functions have not yet become fully known.

The *pancreas*, commonly called the sweetbread, is situated behind the stomach, between the duodenum and the spleen.

Its function is to secrete a fluid called pancreatic juice, which is used in digesting starchy and proteid foods.

Its action upon our food is partly the same as saliva in the mouth, turning starch into sugar.

The *kidneys* are bean-shaped organs, two in number, lying far back in the abdomen, one on each side of the vertebral column, to which also they are attached.

The function of these organs is to purify the blood of its waste and poisonous materials, which, if they are allowed to remain in the body, would prove injurious.

The *ureters* are two long tubes leading from the middle line of the kidneys, whose duty it is to convey the urine from the kidneys to the bladder.

The *bladder* is a muscular bag lying just behind the pubes. Its function being to store up the urine, until its accumulation produces a feeling of discomfort, which leads to its expulsion through the urethra.

CHAPTER III.

CARTILAGE AND BONE.

CARTILAGE, or *gristle*, is a substance which is both firm and flexible. It is white in appearance, and possesses neither blood-vessels nor nerves.

The bones of infants are composed of gristle, which is termed *temporary cartilage*. The lower portion of the ear and nose, and that part of the ribs known as the costal cartilage, is termed *permanent cartilage*, as it does not form into bone as age advances.

Cartilage also forms a covering for the ends of all movable joints.

Bone is composed of two parts evenly blended, *viz.*, animal and mineral.

There are four classes of bones, *viz.*, long, flat, short and irregular.

Each bone consists of an outer layer, which is hard, dense and compact, and an inner, which is porous and spongy in appearance.

A thin layer of compact tissue caps all the articular ends of the *long bones*, such as the bones of the legs and arms.

The central cavity in a long bone is called the *medullary canal*, and contains a soft substance called marrow.

In the *short* and *irregular bones*, such as the wrist and vertebræ. there is no central cavity, only the spongy tissue fills the interior, while the outside consists of a thin layer of compact tissue.

In the *flat bones*, such as the scapula, and parietal, we have two layers of compact tissue outside one layer of spongy tissue.

A smooth layer of articular cartilage covers that part of a bone which helps in the formation of a joint.

The remaining surfaces of these bones are covered with a thick tough membrane called the periosteum.

The bone is nourished by means of blood-vessels distributed through this membrane.

In the long bones we have an artery which enters at the shaft, and supplies nourishment for the medullary canal. This artery breaks up into smaller branches, which supply the marrow with nourishment, and these again divide into smaller vessels, and supply nourishment for the interior of the bone.

The cancellous or spongy tissue derives its nourishment through small blood-vessels, which pierce the articular extremities.

The uses of the *periosteum* are:—

1. It assists in the attachment of a bone to the muscles and ligaments.

2. It makes the surfaces of the bones smoother, and thus lessens friction.

3. It also forms a medium for the blood-vessels to divide into smaller branches before they enter the tiny openings in the surfaces of the bones. These blood-vessels are then distributed and supply the bones with nourishment.

CHAPTER IV.

LIGAMENTS, TENDONS, PROCESSES AND JOINTS.

LIGAMENTS are strong straps or bands of fibres, which serve to bind bones together, to allow them freedom of movement, and to prevent dislocation.

Tendons are white, smooth, tough cords which bind muscles to bone, and assist the muscles to move the bones.

Processes are the little projections found all over the skeleton in different parts, such as the acromion process of the scapula.

Joints are the connection of two or more bones, either partially or otherwise.

There are two different kinds of joints, *viz.*, movable and immovable.

These may again be divided into perfect and imperfect.

The *perfect joints* are those in which the ends of the movable bones are protected by a layer of cartilage, and also are lined by a synovial sac, which keeps the joints moistened by the fluid secreted called *synovia.*

The *imperfect joints* allow of only a limited motion, such as the joints of the vertebræ, and they have no synovial sac, and are not lined with cartilage.

Other names applied to joints are:—

Ball-and-socket.
Hinge.
Gliding.
Pivot.

The *ball-and-socket* joint occurs in the humerus and femur. It consists of a rounded head fitting into a cavity, and it is capable of moving in every direction.

The *hinge joints* are the most numerous, and resemble a common hinge. They allow of the backward and forward movement only.

The elbows and knees are examples of these, and the ankles and wrists are imperfect hinge joints, and are termed gliding joints. Then in the thumb we have a *double hinge joint* which articulates with the wrist.

Pivot joints occur in the human skeleton, of which the only perfect one is the top joint of the vertebræ.

It is called the atlas, and is so constructed on the pivot of the axis, that the head may turn round from side to side.

The radius also moves round the ulna on a pivot, possessing more of a slight gliding movement.

CHAPTER V.

THE MUSCULAR SYSTEM.

MUSCLE is the fleshy part of the body, which covers the whole of the bony framework.

It is composed of red fleshy contractile fibres, which are bound together in masses by a thin membrane.

The chief uses of muscle are :—

To assist our bones to move.

To form a protection for the whole of the bony framework.

To give it its rounded appearance.

It also supplies a large proportion of the heat of the body.

There are two kinds of muscles, *viz.* :—

Hollow or involuntary, and solid or voluntary muscles.

Involuntary muscles are those over which the will has no control, such as are found in the various internal organs, and in the walls of the blood-vessels. They are usually hollow.

The hollow muscles are those which enclose a cavity, such as the heart and stomach, which have the power of expansion and contraction apart from the will.

Solid muscles are mostly attached to bones, and are under the control of the will. They give us the power of movement.

Both hollow and solid muscles are composed of fibres, which have the power of contraction and thus of movement.

Examined under a microscope a voluntary muscle is seen to consist of bundles of fibres, each encased in a very thin but tough membrane. If this membrane be boiled, it can be pulled apart, and it will then be seen that each of the bundles is composed of still smaller bundles of fibres, which are termed fasciculi.

The *fasciculi* are again composed of still smaller bundles of fibres, termed *fibrillæ.*

Now in each of the fibres which compose the fibrillæ, there are minute disc-shaped bodies, which in their arrangement give the fibres the appearance of being striped or striated.

Each fibre in the voluntary muscle is encased in a sheath of tough membrane which is termed *sarcolemma.*

Involuntary muscles, when microscopically examined, do not present the striped marks—they are unstriped or non-striated.

Moreover, although, like the voluntary muscles, they are made up of bundles of fibres, they are not uniform in diameter throughout; but on the whole consist of elongated cells pointed at the ends, and they have no sheath of connective tissue.

In the case of the heart, however, although the muscle is an involuntary one, the fibres which compose it have the same striated appearance as the voluntary muscles.

Solid muscles, as we have said, are attached to bones, and are under the control of the will. When in a contracted state they decrease in length and increase in thickness.

The bundles of contractile fibres, of which the muscles are composed, end at the top and bottom in a tendon as a general rule.

The *origin* is the end of a *tendon* which is attached to a fixed bone, and the *insertion* is the tendon which is attached to a movable bone.

Situated between the tendons and bones are little bags of fluid which prevent the tendons from rubbing against the bones. They are called *bursæ*.

Solid muscles are usually arranged in pairs called flexors and extensors, which move in opposite directions.

Flexors are the muscles brought into action when we wish to bend the limb, and are generally arranged on the inner side of the limb.

Extensors are the muscles which are brought into use when we wish to straighten the limbs, and they are arranged on the outer sides.

Sphincter muscles are the muscles which surround the rectum and pylorus.

These muscles are arranged in rings, and when contracted they close a cavity, and when relaxed they permit an opening into the same.

Such muscles are voluntary in health; but when diseased they become involuntary.

The *orbicular muscles* are those which close the eyes and mouth.

SOME IMPORT-

NAME.	POSITION.	ORIGIN.
Sterno-cleido-mastoid.	Most prominent muscle projecting on side of neck.	Sternum and clavicle.
Trapezius.	Triangular muscle covering large portion of back, from occiput to last of thoracic vertebræ.	Superior curved line of occipital bone, from ligamentum nuchæ, from spinous processes of seventh cervical and all the thoracic vertebræ.
Latissimus dorsi.	Triangular muscle covering lower portion of back.	Spinous processes of lower six thoracic vertebræ, spinous processes of lumbar and sacral vertebræ, and posterior part of crest of ilium.
Levator anguli scapulæ.	Strap-like muscle directed downwards along the side of the neck.	Transverse processes of three or four cervical vertebræ.

ANT MUSCLES.

INSERTION.	NERVE SUPPLY.	MOVEMENT.
Mastoid process, and superior curved line of occipital bone.	Spinal accessory, and branch from cervical plexus.	Flexes head on vertebral column, draws head to one side, and rotates it.
Outer third, posterior surface of clavicle, inner side of acromion process, and upper surface of spine of scapula, its whole length.	Spinal accessory, and branch from cervical plexus.	Bends neck backwards, and to one side, raises shoulder and arm.
Floor of bicipital groove of humerus.	Long sub-scapular.	Draws arm inwards and backwards and rotates it.
Upper part of vertebral border and superior angle of scapula.	Cervical plexus and posterior scapular.	Raises the upper angle of scapula.

NAME.	POSITION.	ORIGIN.
Rhomboideus minor.	Passes obliquely downwards and outwards, from ligamentum nuchæ to opposite root of spine of scapula.	Ligamentum nuchæ, spinous processes of seventh cervical and one or two thoracic vertebræ.
Rhomboideus major.	Below lower portion of Rhomboideus minor.	Spinous processes of four or five upper thoracic vertebræ.
Pectoralis major.	Large fan-shaped muscle, situated on anterior surface of trunk at upper end.	Clavicle, sternum and seven superior costal cartilages.
Pectoralis minor.	Narrow, flat, triangular muscle, situated underneath the pectoralis major.	Third, fourth and fifth ribs.
Serratus magnus.	Large curved muscle, situated on the side of the chest, and inner wall of axilla.	Eight upper ribs, by nine fleshy slips, two proceeding from second rib.

(*Continued*).

INSERTION.	NERVE SUPPLY.	MOVEMENT.
Vertebral border of scapula, opposite root of spine of scapula.	Posterior scapular.	Draws the inferior angle of scapula upwards and backwards.
Vertebral border of scapula, between spine and inferior angle.	Posterior scapular.	Draws inferior angle of scapula upwards and backwards.
Outer border of bicipital groove of humerus.	External anterior thoracic and internal anterior thoracic.	Carries arm across body.
Into the front surface of extremity of coracoid process.	Internal anterior thoracic.	Lowers point of shoulder.
Vertebral border of scapula.	Posterior thoracic.	Pulls whole arm forwards, and during act of inspiration raises ribs.

MUSCLES—

NAME.	POSITION.	ORIGIN.
Deltoid.	V-shaped muscle, situated on upper extremity of humerus, forming prominence of shoulder.	1. Outer end of clavicle. 2. Outer border of acromion process. 3. Lower border of spine of scapula.
Supra-spinatus.	Situated on upper portion of scapula, above its spine.	Supra-spinous fossa.
Infra-spinatus.	Situated on lower border of scapula below its spine.	Infra-spinous fossa.
Teres minor.	Small flat muscle, situated on dorsal aspect of the scapula.	Anterior border of scapula.

Continued).

INSERTION.	NERVE SUPPLY.	MOVEMENT.
Upper part of shaft of humerus, on outer side.	Circumflex.	Raises arm from side, and draws it backwards and forwards.
Uppermost facet on greater tuberosity of humerus.	Supra-scapular.	Helps with the deltoid in lifting the arm from the side, and rotates it outwards.
Middle facet on great tuberosity of humerus.	Supra-scapular.	Rotates the head of the humerus in the outward direction.
Lowest facet on great tuberosity of humerus.	Circumflex.	Rotates the head of the humerus in an outward direction.

MUSCLES—

NAME.	POSITION.	ORIGIN.
Teres major.	Larger muscle than teres minor, situated on dorsal aspect and directed along the axillary border of the scapula to the front of the shaft of humerus.	Inferior angle of scapula.
Sub-scapularis.	Large triangular muscle, occupying under surface of scapula.	Whole of sub-scapular fossa, with the exception of the angles of the bone.
Coraco-brachialis.	Small muscle, situated on the front and inner aspect of the upper part of humerus.	Tip of coracoid process of scapula.
Biceps (2 heads).	Large superficial muscle, situated on the front of upper arm.	Above the glenoid cavity, and from the coracoid process of scapula.

(*Continued*).

INSERTION.	NERVE SUPPLY.	MOVEMENT.
Inner border of bicipital groove.	Lowest sub-scapular.	Helps with the latissimus dorsi, in drawing humerus backwards and downwards, and rotates it inwards.
Lesser tuberosity of humerus.	Sub-scapular.	Rotates the head of the humerus inwards.
Faint impression, about an inch in length, on the middle of the inner border of the humerus.	Musculo-cutaneous.	The upper arm is drawn forwards and inwards.
Bicipital tubercle of radius.	Musculo-cutaneous.	Flexes forearm.

MUSCLES—

NAME.	POSITION.	ORIGIN.
Brachialis anticus.	Large muscle, situated on lower and front portion of humerus.	Lower portion of shaft of humerus.
Triceps (3 heads).	Only muscle felt on back of arm.	1. Below the glenoid fossa. 2. Above musculo-spiral groove of humerus. 3. Below musculo-spiral groove.
Anconeus.	Small muscle at back of elbow.	Back of external condyle of humerus.
Pronator radii teres.	Shortest muscle of forearm, lying in an oblique position at its upper extremity.	Internal condyle of humerus, inner side of coronoid process of ulna.
Flexor carpi radialis.	Situated on outer side of forearm.	Internal condyle of humerus.

(*Continued*).

INSERTION.	NERVE SUPPLY.	MOVEMENT.
Coronoid process of the ulna.	Musculo-cutaneous and musculo-spiral.	Flexes forearm.
Upper end of olecranon process.	Musculo-spiral.	Extends forearm.
Outer side of olecranon process, and oblique line on back of ulna.	Musculo-spiral.	Extends forearm.
Impression on middle of outer surface of radius.	Median.	Pronates hand, and assists biceps muscle in flexing forearm.
Upper ends of the second and third metacarpal bones, on their anterior surfaces.	Median.	Flexes wrist.

NAME.	POSITION.	ORIGIN.
Palmaris longus.	A short muscle which ends in the middle of the forearm in a long tendon.	Internal condyle, and fascia of forearm.
Flexor carpi ulnaris.	Situated superficially along inner border of forearm.	Inner condyle of humerus, olecranon process and border of ulna, at its upper extremity.
Flexor sublimis digitorum.	Situated along front of forearm.	Internal condyle of humerus, coronoid process of ulna, and outer border of radius.
Supinator longus.	Situated on outer side of forearm.	External condyloid ridge of humerus.
Extensor carpi radialis longior.	On outer side of forearm.	External condyloid ridge of humerus.
Extensor carpi radialis brevior.	Along back of forearm.	External condyle of humerus.

(*Continued*).

INSERTION.	NERVE SUPPLY.	MOVEMENT.
Anterior annular ligament, and palmar fascia.	Median.	Flexes wrist.
Pisiform bone.	Ulnar.	Flexes wrist.
Into sides of second phalanges of fingers by four tendons.	Median.	Flexes fingers.
Styloid process of radius.	Musculo-spiral.	Supinates hand.
Back of the base of second metacarpal bone.	Musculo-spiral.	Extends wrist.
Back of the base of the third metacarpal bone.	Posterior interosseous.	Extends wrist.

NAME.	POSITION.	ORIGIN.
Extensor carpi ulnaris.	Posterior border of ulna.	External condyle of humerus.
Extensor communis digitorum.	Extends along back of forearm.	External condyle of humerus.
External intercostal.	Situated in thin layers, between intercostal spaces.	Lower border of ribs.
Internal intercostal.	Situated between intercostal spaces.	Lower border of ribs.
Diaphragm.	Muscular partition, separating thorax from abdomen.	Posterior surface of ensiform cartilage. Lower six ribs on each side. From bodies of lumbar vertebræ.

(*Continued*).

INSERTION.	NERVE SUPPLY.	MOVEMENT.
Back of base of the fifth metacarpal bone.	Posterior interosseous.	Extends wrist.
Back of last two phalanges of the four fingers.	Posterior interosseous.	Extends fingers.
Outer edge of upper border of ribs.	Intercostal.	Ribs are raised during inspiration.
Inner edge of upper border of ribs.	Intercostal.	Ribs are depressed during expiration.
Central tendon.	Phrenic.	Inspiration, and also expels air from chest.

NAME.	POSITION.	ORIGIN.
Rectus abdominis.	Broad, flat muscle, anterior surface of abdomen.	Symphysis and crest of pubis.
Obliquus externus.	Broad, thin sheet of muscle, at side and front of abdominal wall, in an oblique position.	From outer surfaces of eight lower ribs by digitations.
Obliquus internus.	Broad, thin sheet of muscle, lying between the obliquus externus and transversalis muscles.	Anterior half of iliac crest. Lumbar fascia. Outer half of Poupart's ligament.
Transversalis.	Underlying obliquus internus.	Cartilages of six lower ribs. Lumbar fascia. Anterior half of the inner lip of crest of ilium. Outer third of Poupart's ligament.

(*Continued*).

INSERTION.	NERVE SUPPLY.	MOVEMENT.
Into front of ensiform cartilage, and into fifth, sixth and seventh costal cartilages.	Intercostal.	Flexes thorax, compresses internal organs: keeps abdominal wall tense.
External lip of crest of ilium, ensiform cartilage, pubis and linea alba.	Intercostal.	Flexes thorax, compresses internal organs.
Into the lower six ribs. Linea alba. From ensiform cartilage to symphysis pubis.	Intercostal.	Flexes thorax, compresses internal organs.
Ensiform cartilage. Linea alba. Ilio-pectineal line.	Intercostal.	Flexes thorax, compresses internal organs.

NAME.	POSITION.	ORIGIN.
Sartorius.	Strap-like muscle, stretching obliquely across the inner part of thigh.	Anterior - superior spine of ilium, and notch below it.
Rectus femoris.	Situated in front of thigh.	Anterior - inferior spine of ilium, upper border of acetabulum.
Vastus externus.	On outer surface of front of thigh.	Great trochanter, shaft of femur, linea aspera.
Vastus internus.	On inner side of front of thigh.	Small trochanter, shaft of femur, linea aspera.
Crureus.	On outer side of front of thigh.	Front and outer side of shaft of femur.
Psoas magnus.	Large muscle lying in posterior wall of abdomen.	Bodies, and transverse processes of last dorsal and all lumbar vertebræ.

Continued).

INSERTION.	NERVE SUPPLY.	MOVEMENT.
Just below inner tuberosity of shaft of tibia on inner side.	Anterior crural.	Flexes leg on thigh, crosses legs.
Patella.	Anterior crural.	Flexes thigh and extends leg.
Patella.	Anterior crural.	Extends leg.
Patella.	Anterior crural.	Extends leg.
Patella.	Anterior crural.	Extends leg.
Lesser trochanter.	Anterior crural.	Flexes the trunk on the thigh, and also flexes the thigh on the trunk.

NAME.	POSITION.	ORIGIN.
Iliacus.	Fan-shaped muscle, passing downwards over the hip joint towards the lesser trochanter.	Iliac fossa, and crest of ilium.
Gracilis.	On inner side of thigh and knee.	Rami of pubes and ischium.
Adductor longus.	On inner side of thigh, extending downwards and outwards.	Between the crest and symphysis of pubis.
Adductor brevis.	On inner side of thigh, directed downwards and outwards.	From body of the pubis.
Adductor magnus.	On inner side of thigh.	Rami of pubes and ischium.
Gluteus maximus.	Region of buttock.	Posterior portion of superior curved line of crest of ilium, sacrum and coccyx.

(*Continued*).

INSERTION.	NERVE SUPPLY.	MOVEMENT.
Lesser trochanter.	Anterior crural.	Flexes trunk on thigh, and also flexes thigh on trunk.
Below tuberosity on inner side of shaft of tibia.	Obturator.	Flexes leg, and adducts thigh.
Middle of linea aspera.	Obturator.	Adducts and flexes thigh.
Upper portion of linea aspera.	Obturator.	Adducts and flexes thigh.
Linea aspera, internal condyle of femur, and adductor tubercle.	Obturator, and the great sciatic.	Adducts, flexes and rotates thigh.
Back of femur and fascia of thigh.	Inferior gluteal.	Extends, abducts and rotates thigh.

MUSCLES—

NAME.	POSITION.	ORIGIN.
Gluteus medius.	Region of buttock.	Posterior portion of ilium, between the crest and middle curved line.
Gluteus minimus.	Region of buttock.	Between the middle and inferior curved lines of ilium.
Biceps femoris (outer hamstring).	Back of thigh.	Tuberosity of ischium and external condyloid ridge of femur.
Semitendinosus (inner hamstring).	Back of thigh.	Tuberosity of ischium.
Semimembranosus (inner hamstring).	Back of thigh.	Tuberosity of ischium.
Tibialis anticus.	Front of leg.	Outer surface of shaft of tibia.

(Continued).

INSERTION.	NERVE SUPPLY.	MOVEMENT.
Great trochanter.	Superior gluteal.	Extends, abducts and rotates thigh.
Great trochanter.	Superior gluteal.	Extends, abducts and rotates thigh.
Head of fibula.	Great sciatic.	Flexes leg.
Inner side of shaft of tibia, just below inner tuberosity.	Great sciatic.	Flexes leg.
Back of inner tuberosity of tibia.	Great sciatic.	Flexes leg.
Inner cuneiform and base of first metatarsal bone.	Anterior tibial.	Flexes foot and inverts the sole.

NAME.	POSITION.	ORIGIN.
Extensor longus digitorum.	Front of leg.	External tuberosity of tibia, and front of fibula.
Peroneus longus.	Outer side of leg.	Outer surface of upper end of shaft of fibula.
Peroneus brevis.	Outer side of leg.	Outer surface of lower end of shaft of fibula.
Gastrocnemius.	Back of leg.	External and internal condyle of femur.
Soleus.	Back of leg.	Back of head and shaft of fibula.
Flexor longus digitorum.	Back of leg and sole of foot.	Posterior surface of tibia.

(*Continued*).

INSERTION.	NERVE SUPPLY.	MOVEMENT.
Into sides of second and third phalanges by four tendons.	Anterior tibial.	Extends toes.
Internal cuneiform and base of first metatarsal bone.	Musculo-cutaneous.	Extends foot and everts sole.
Base of fifth metatarsal bone.	Musculo-cutaneous.	Extends foot.
Os calcis, by Achilles tendon.	Posterior tibial.	Extends foot and flexes leg on thigh.
Os calcis, by Achilles tendon.	Posterior tibial.	Extends foot.
Into last phalanges of four lesser toes by four tendons.	Posterior tibial.	Flexes toes.

CHAPTER VI.

THE NERVOUS SYSTEM.

THE *nervous system* governs and controls and brings into harmony all the systems of the body.

It consists of two distinct, but nevertheless connected parts, *viz.* :—

The *cerebro-spinal* and the *sympathetic systems.*

The brain, spinal cord, and all the nerves which branch from them, constitute the cerebro-spinal system.

The *sympathetic* or *ganglionic* system consists of small masses of nerve matter, each mass being called a ganglion. From these masses branch off nerve fibres.

The substance of nerve tissue is either composed of cells or fibres.

The cellular tissue is composed of cells with fibres intermingled, and forms the grey substance which is found in the brain, spinal cord, and all nerve centres.

The fibrous substance or nerve tissue is composed only of fibres, or threads of protoplasm, which are of two kinds, *viz.*, grey and white.

Nerves are composed of bundles of these fibres, which are bound up together in a sheath of tissue, and in appearance are like white threads.

These threads are distributed throughout the entire body, branching off in every direction.

There are three kinds of nerves, *viz.* :—

1. *Motor*, termed also *efferent* nerves, are those which carry certain impulses from the brain to the muscles.

2. *Sensory* or *afferent* nerves are those which have the power to carry impressions to the brain and spinal cord.

3. *Mixed* or *compound nerves* are a combination of both sensory and motor fibres, and in consequence are capable of carrying nerve impulses in both directions.

The *brain*, which is enclosed in the skull, is the great nerve centre of the body. It has three coverings, *viz.* :—

1. The *pia mater*, which is a very thin membrane, containing numerous small arteries and veins which form a network, and are supported by connective tissue. It is from this membrane that the brain is supplied with blood.

2. The *arachnoid* membrane, a serous membrane, which is transparent, and very delicate in substance.

3. The *dura mater*, a tough membrane fibrous on its outer side, where it is in contact with the inner surface of the skull, but smooth on its inner portion which covers the arachnoid membrane.

The brain may be divided into several parts. the most important of which are:—

The *cerebrum* or greater brain, which constitutes nearly the whole brain, and almost fills the entire brain-box.

Underneath lies the *cerebellum* or smaller brain, and the *medulla oblongata*, which is the portion connecting the brain with the spinal cord, and is the place where the nerve fibres cross.

The *Pons varolii* is a prominent white elevation situated above the medulla oblongata, and in close connection with it. It joins the cerebellum with the medulla oblongata.

The *cerebrum* or greater brain is the chief centre of the intellect, will and emotions, and originates voluntary movements. It and the rest of the brain give off twelve pairs of nerves called cranial nerves, which govern chiefly the muscles over which the will has no control.

The *functions of cerebellum* or smaller brain, as far as can be ascertained, is the regulation and controlling of the entire movements of the body once these movements have been originated by the cerebrum.

The *function of the medulla oblongata* is very important, as it governs the movements of breathing and swallowing and acts as a medium between the brain and spinal cord.

The *spinal cord* is a column of nervous matter about eighteen inches in length. It begins at the medulla oblongata, and extends to the second lumbar vertebra.

Like the brain, it has three coats, *viz.*:—

1. *Pia mater*, from which it receives its blood supply.

2. The *arachnoid* membrane, which lies over the pia mater, and

3. The *dura mater*, or outer covering, which is a continuation of the covering of the brain.

The spinal cord is not only a nerve centre, but also a conductor of sensations to the brain.

From the spinal cord are given off large nerves. There are thirty-one pairs in all, which are situated on each side of the spinal column, and are called spinal nerves.

Where the cord ends, the spinal nerves terminate in fibres, and have been called *cauda equina*, a term which signifies a horse's tail.

Each nerve is connected to the spinal cord by two roots, one for the motor impulses, called the *anterior root*, and one for the sensory impulses, called the *posterior root*.

From the roots these nerves branch off to all parts of the system, and by them we receive impressions, and also have power to move our muscles.

The *sympathetic system* is connected with the cerebro-spinal system by the nerve fibres.

The force which is stored up in the nerve centres passes along the nerve fibres, and supplies certain of the involuntary movements which they control, and also the coats of the blood-vessels regulating the blood supply throughout the body.

The twelve pairs of cranial nerves are:—

First pair, olfactory, which are sensory nerves, proceeding to the nose.

Second pair, optic; these are also sensory and proceed to the eyes.

Third pair, motores oculi, motor nerves which govern the muscles of the eyes.

Fourth pair, trochlear, also motor, supplying the superior oblique muscles of the eyes.

Fifth pair, trifacial; these are intermixed and proceed to the integuments of the face and teeth, and also govern the muscles used in mastication.

Sixth pair, abducens; these are motor nerves, and supply the abductor muscle of the eyeball.

Seventh pair, facial, which are also motor, and govern the muscles of facial expression.

Eighth pair, auditory; these are sensory nerves and proceed to the inner ear.

Ninth pair, glosso-pharyngeal; these are mixed and govern the muscles of the pharynx, and also enable us to taste.

Tenth pair, pneumogastric or *vagus,* are also mixed, and send branches to the œsophagus, trachea, lungs, heart, and through the diaphragm to the stomach.

Eleventh pair, spinal accessory, are the motor nerves which govern chiefly the sterno-mastoid and trapezius muscles.

Twelfth pair, hypoglossal, that is the motor nerve governing the muscle of the tongue.

The *thirty-one pairs of spinal nerves* are reckoned from above downwards, and derive their names from the part in which they are situated.

Thus the cervical pairs of nerves (Latin, *cervix,* the neck) are situated in the neck; the dorsal pairs of nerves (Latin, *dorsum*, the back) in the back, and so on.

The first four pairs of *cervical nerves* join and form the cervical plexus, which governs the muscles of the neck and head. They also give off the phrenic nerve which governs the diaphragm.

Below the cervical plexus we have the *brachial plexus*, which is a joining of the four lower cervical and first dorsal nerves. It supplies the arm with nerves.

The *main nerve trunks for the arm are*:—

The median.

The ulnar.

The musculo-spiral.

The *median nerve*, starting from the lower part of the neck, passes under the collar-bone and on to the axilla.

From this it passes along the front of the upper arm on the inner side, until it reaches the elbow; it then passes in a straight line along the forearm, until it reaches about two inches from the wrist, and passing under the annular ligament sends branches to supply the thumb. the first, second and third fingers.

The *ulnar nerve* is also a branch which originates in the brachial plexus.

Its descent is along the upper arm on its inner side until reaching the elbow; it then takes its course between the back of the internal condyle of the humerus and olecranon, and passing along the forearm, along the ulnar side, over the annular ligament, gives off the nerves to supply the palm of the hand and the little and third fingers.

The *musculo-spiral nerve* is also derived from the brachial plexus, and passing down the arm turns round the middle of the back of the humerus to reach the outer side of the elbow, where it divides, sending off a branch, called the *radial nerve*, which runs along the outer side of the forearm, and to the hand.

The musculo-spiral is the largest of the three nerve trunks given off from the brachial plexus, and by it the muscles of the back of the arm and hand are governed.

Below the brachial plexus we have the *dorsal nerves*, called intercostal nerves, which govern the intercostal muscles and the abdominal muscles.

Below the dorsal nerves we have the *lumbar plexus*, which is a joining of the first three or four lumbar nerves, and belong to the same system of nerves as the dorsal.

It is from the lumbar plexus that the *anterior crural nerve* is given off.

This nerve takes its course between the psoas magnus and iliacus muscles, passing out of the pelvis below Poupart's ligament, and from this gives off branches which supply the muscles situated on the sides and in front of the thigh.

The *sacral plexus*, which is formed by a joining of some of the lumbar and sacral nerves, sends off the largest nerve cord in the body, called the *great sciatic.* It measures in breadth three-fourths of an inch, and from it are given off all the nerves supplying the back of the thigh, the leg and the foot.

It is transmitted through the great sciatic notch, and taking its descent between the great trochanter and the tuberosity of the ischium, extends through the buttock and the back of the thigh until within about one-third of the length of the thigh from the knee, where it divides into two branches, called the popliteal nerves.

The *internal popliteal* is a continuation of the great sciatic nerve, and passes through the popliteal space in a straight line, and down the back of the leg, where it is termed the *posterior tibial nerve.* It continues its descent until it arrives between the inner ankle and the heel and divides into the *plantar nerves*, called internal and external, according to the muscles governed by them.

The *external popliteal*, which is the smaller branch given off from the great sciatic, extends to the head of the fibula, around which it takes its course, and divides into the anterior tibial and musculo-cutaneous nerves.

The *anterior tibial* passes down in front of the leg, and divides at the ankle, sending off two branches, internal and external, which supply the foot and toes.

The *musculo-cutaneous* passes down the outer side of the leg, as far as the front of the outer ankle, and thence sends off branches to the foot and toes.

CHAPTER VII.

THE CIRCULATORY SYSTEM.

THE *heart* is an organ composed of muscular fibres which enclose a cavity. It has the power of expansion, termed its *diastole* or dilatation, which takes place when the blood is received into its chambers; and the power of contraction, which is termed its *systole*, and is the means by which it sends the blood throughout the body.

Blood is carried throughout the system by means of arteries, capillaries and veins; but it is by means of the heart, acting as a pumping machine, that the blood is driven through these vessels.

The *heart has three coats.* Beginning from the inside lining, is the endocardium, which is a very thin membrane.

The next is composed of muscular tissue; and the last and outer covering is a strong, tough coat formed of connective tissue, which is composed of elastic and connective tissue fibres, and is termed the epicardium.

In a less degree of thickness these structures are somewhat similar for the arteries, capillaries and veins.

The *pericardium* is a membranous bag, which surrounds the heart; one part lies closely round it, and the other hangs loosely to it. It secretes a serous fluid.

The heart is, commonly speaking, about the size of its owner's own hand when closed.

The top or broad end is termed its *base*, and the lower and pointed end is termed its apex.

It has four chambers; the upper two are called the right and left *auricles* and the lower two the right and left *ventricles* respectively.

There is no opening between the ventricles; but each auricle opens into the corresponding ventricle.

The *pure blood* is received and distributed by the left side of the heart, and the *impure blood* is received and distributed by the right side of the heart.

The *inferior* and *superior vena cava* are the two large veins by which impure blood is brought to the right side of the heart. The former collects all the blood which has been distributed through the part of the body which lies below the heart, and the latter collects the blood which has been distributed through the part of the body lying above the heart.

Both these veins empty their blood into the right auricle, which dilates to receive it. When this chamber is full it contracts — the contraction beginning where the veins enter the auricles, thus preventing the blood from returning, although there are no valves in the veins.

The blood then enters the right ventricle.

These two chambers are divided by a valve called the *tricuspid valve*, composed of three cusps.

The cusps are attached by fine but strong threads termed the *cordæ tendineæ* to the inside of the ventricle wall.

The blood coming from the auricle presses on these little cusps, and causes them to lie close to the walls of the ventricle, and thus the blood is allowed a free passage into its chambers while the ventricle dilates to receive the flow, and contracts when it is full.

As the ventricle contracts some of the blood gets up behind these cusps and floats them up; they then come together and form a partition between the auricle and ventricle.

From the ventricle the blood is forced into the only artery in the body carrying impure blood, called the *pulmonary artery.* This artery at its entrance is possessed of three semi-lunar valves which have no cordæ tendinæ. As the blood is pressed into this artery, the valves lie closely to its walls; but when the blood has entered, the valves close, and prevent the blood from regurgitating.

The blood is then carried to the lungs to be purified.

The pulmonary artery ends in capillaries, and around the air-cells in the lungs these capillaries are distributed. Carbonic acid is here parted with, being waste and injurious, and oxygen is collected.

These tiny vessels (capillaries) unite, growing larger and larger, forming vessels termed veins, which at last unite into the only veins in the body carrying pure blood, namely, the *pulmonary veins.*

These veins enter into the left auricle, which dilates to receive their blood, and contracts when it is full, as in the right auricle. The blood then enters the left ventricle through the bicuspid valves, and when its chamber is full the cusps float up, as in the right ventricle, and the contraction which follows sends the blood through the semi-lunar valves, which are at the entrance of the aorta, the largest artery in the body.

Blood is sent through the artery by the contraction of the ventricles, and is also helped by the elastic recoil of the arteries themselves, which helps to keep up a continuous flow. The left ventricle has much thicker and more muscular walls than any of the others.

Valves are also arranged in the veins in shape like the semi-lunar valves which are situated at the entrance of the pulmonary and aortic arteries, and it is by the aid of these valves that the blood in the veins is assisted back to the heart.

CHAPTER VIII.

CIRCULATION OF THE BLOOD.

THE largest artery in the body is termed the *aorta*, and it is through this vessel that blood is distributed throughout the whole system.

Its origin is from the left side of the heart, where it forms a kind of arch, termed the aortic arch, which gives off all the blood-vessels supplying the upper portion of the body.

Amongst these are the right and left *common carotid arteries*. These run up the side of the neck, supplying the head and face with blood.

The right and left *subclavian arteries* are two blood-vessels which run under the axilla, and continue down the upper arm, where they are termed the *brachial arteries;* when the brachial artery arrives at the elbow it divides into two branches, running down the forearm, and these are termed the *radial* and *ulnar arteries.*

It is in the former the pulse is usually felt. These two branches flow into the palm of the hand, and form a kind of arch, termed the *palmar arch*, which supplies blood to the fingers.

We now return to the aorta, and we find it sends out small vessels for supplying the heart itself close to its own origin.

After the arch it turns down through the thorax, and piercing the diaphragm runs slightly to the left of the spinal column, where it is termed the *abdominal aorta.*

The abdominal aorta divides into two branches, namely:—

The right and left *iliac arteries*, which divide again into two, called the internal and external iliac arteries.

The *internal iliac* artery supplies the pelvic organs with blood, whilst the *external iliac* artery passes down in front of the groin, and thence to the front of the femur. where it is called the *femoral artery.*

When half-way down it turns and goes behind the knee, and is termed the popliteal artery.

The *popliteal artery* sends out two branches which supply the lower leg, forming an arch in the middle of the foot, similar to that of the hand, and supplying the toes with blood.

The arteries terminate in small capillaries for the supply of the immediate tissues and then unite and form small veins, and as they collect the blood they grow larger and larger, until they unite in one large vein, which is called the inferior vena cava; those in the upper part of the body do likewise, and terminate in the superior vena cava. Both enter the right side of the heart.

CHAPTER IX.

COMPOSITION OF BLOOD.

THE *blood* is composed of a colourless alkaline liquid termed plasma or liquor sanguinis, and numberless tiny bodies called corpuscles.

The liquor sanguinis is made up of water, mineral salts, albumin and nitrogenous materials.

The more solid part of the blood is composed of the corpuscles, which are of two kinds, *viz.*, red and white.

The *red corpuscles* are more numerous than the white, the proportion being about 1 white to 500 red; but they are much smaller. In themselves they have no power of movement; but are carried along in the blood stream as it flows through the vessels.

If examined separately, they are of a yellowish hue; but when massed together they give the red appearance to the blood.

The *hæmogoblin* is the colouring matter of the blood, which is entangled in the meshes of the framework of which the corpuscles appear to be composed.

The construction of this elastic kind of framework is such that the corpuscles when passing through a narrow opening can change their shape quite easily.

White corpuscles are in size slightly larger than the red. They can change their shape and, unlike the red, have the power of movement in themselves.

They consist of a nucleus surrounded by a substance called protoplasm, and move along by the aid of little processes they are constantly sending out.

As long as blood is warm and moving in the body, it remains in a liquid state; but if drawn from the body, on standing it forms a clot.

This *clot* at first is really a mass of blood; but when left, a liquid exudes, which is a pale yellowish hue, and as the liquid increases the clot becomes smaller and floats in it.

This liquid is called *serum*.

Clotting of the blood is caused by a substance forming therein called fibrin.

This *fibrin* is not found in the blood as it circulates through the body; but its formation takes place suddenly, after it has been drawn off, and is termed *coagulation.*

The chief uses of blood are:—

1. It is a means to carry nourishment which has been absorbed from the food taken throughout the entire system.

2. It carries the matter from which the secretions are made to the different glands which prepare them.

3. It carries oxygen to the different tissues where it is required, and which is necessary to maintain the bodily temperature.

4. It collects from the whole system the poisonous matter, and conveys it to the excretory organs with a view to its separation and removal.

5. The blood also serves a means for distribution of heat throughout the body, and helps to keep the tissues moistened.

CHAPTER X.

DIGESTIVE AND LYMPHATIC SYSTEMS.

THE *alimentary canal* has been described as a long tube which has its commencement in the mouth and ends in the rectum.

This tube is lined by a soft skin called the mucous membrane, which is well supplied with glands, called mucous glands.

These glands are brought into use for separating a watery fluid called mucus, which serves to moisten the membrane. and also helps the food to pass downwards.

In the mouth, stomach, and part of the intestines are other glands, which secrete a fluid required for digestive purposes.

The *salivary glands* contained in the mouth are legion; but the three principal pairs are – the *parotid glands*, which lie below and in front of the ears, and the ducts of which open through the cheek into the mouth; situated under the lower jaw we have the *submaxillary glands*, whose ducts open under the tip of the tongue into the mouth;

situated under the tongue we find the *sublingual glands*, which have several ducts opening into the mouth.

The fluid secreted by these glands is termed *saliva*, which is a transparent watery fluid, with slightly alkaline properties.

Its constituent parts are—water, mineral salts, and ptyalin, which is the active principle.

It is by virtue of the properties of *ptyalin* that the saliva acts on all parts of our food which contains starch, and transforms it into the substance known as maltose, a form of sugar. Thus, in the mouth both mechanical and chemical changes are constantly going on; and we can understand how very necessary it is to masticate our food thoroughly, so that all the starchy parts may be well mixed with saliva, and thus be subjected to this chemical action.

The food then, after entering the mouth, is masticated by the teeth, and at the same time is thinned and softened by the salivary fluid. This process being completed, the tongue carries the food-pulp to the back of the mouth, where it is grasped by certain muscles while the soft palate is moved upwards and backwards, closing the passage into the nose.

Food is prevented from passing down the

trachea by the tongue pushing the epiglottis over the glottis.

The muscles of the œsophagus then grasp the masticated food and carry it to the stomach, no change occurring during its passage down the œsophagus.

The stomach is a bag composed of muscle, and is the chief organ of digestion. It has two openings.

The *cardiac orifice* is the opening from the œsophagus, and the *pyloric orifice* is the opening into the small intestines.

The stomach has four coats or coverings, which are distinct from each other.

The outer covering, which is composed of peritoneum, a serous membrane secreting a fluid which serves to moisten the outer coverings of the organs that move against each other.

The second coat is composed of muscular fibres; the third of areolar tissue; and the fourth or innermost lining of mucous membrane.

The peritoneal coat lines only from the stomach to near the end of the large intestines; but the other three form a lining for the whole of the alimentary canal.

The mucous membrane of the stomach is arranged in folds, which are termed rugæ, and in these folds there are numerous glands, called *peptic glands*, which secrete a fluid called peptic or *gastric juice*.

This juice contains a free acid, hydrochloric acid, a saline matter, and a peculiar substance called pepsin.

The power of digesting food possessed by the gastric juice appears to be due to the presence of this free acid and pepsin.

The fleshy parts of our food or *proteids* being acted upon by these substances, are turned into a semi-fluid form. The combined chemical agency of the saliva and gastric juices finally convert the food into a substance called *chyme*: this is slightly acid, greyish in colour, and of the consistency of gruel.

From a narrow outlet on the right side of the stomach, the chyme flows through the pyloric orifice, to the part of the small intestines known as the *duodenum*, which comprises the first twelve inches.

All liquid food, such as soups, beef-tea, gruel, water, etc., do not remain in the stomach but pass into the duodenum, and are absorbed by tiny vessels in the mucous membrane, called *lacteals*.

As soon as the solid portion of our food begins to be dissolved, a certain portion is absorbed by these lacteals and by the blood-vessels, the latter of which are very small, and are distributed over the stomach and intestines.

These blood-vessels join together and form the *great portal vein*, whose duty it is to carry the nutritious matter to the liver, where it is dealt with. The gastric and salivary juices do not act on all parts of our food; thus fat is not chemically changed in the stomach, but it is acted upon in the duodenum.

The mucous membrane of the duodenum is arranged in folds, which are called valvulæ conniventes, and in these folds glands are placed which secrete a fluid for the intestines called intestinal juice. This juice contains invertine, which has the power of changing cane sugar into grape sugar.

We also have opening into the small intestines the duct from the pancreas and liver.

The *liver*, which is the largest gland in the body, weighs in the adult between fifty and sixty ounces.

It lies at the top of the abdomen beneath the diaphragm at the right side, and is divided into two *lobes*, a right and a left, of which the right is the larger.

These lobes are again divided into very small portions, termed *lobules*.

The liver is covered loosely by the peritoneum, and has an ample supply of blood-vessels. It cleanses the body of a great proportion of the impurities derived from the various organs.

Its vessels are—the portal vein, the hepatic artery, and the hepatic vein. It also has a duct called the hepatic duct, which carries away a substance called bile, derived from the blood.

The blood which comes from the intestinal veins at first is carried to the liver by the portal vein. It is then used and purified, and carried into the inferior vena cava by the hepatic veins, and thus carried to the right side of the heart. This circulation is called the liver or *portal circulation*.

Bile is secreted by the liver, and is stored up in the gall bladder, a small bag lying under the liver, until required for use.

A certain amount is poured out from the gall bladder into the small intestines during the process of digestion. It helps digestion in different ways, the chief by its action upon the fat, which it turns into an emulsion. It stimulates the intestinal coats also, and helps the secretions to flow freely. Moreover, it is a disinfectant and acts as a purgative.

There is another duct opening into the intestine from the pancreas. This carries pancreatic juice, whose action is much the same as saliva.

In the intestines the food remains alkaline, as the bile and pancreatic juice are alkaline.

If we could see the membrane which lines the intestines, it would appear soft and smooth like velvet. It is covered with little conical hair-like projections which are termed villi. All the food which has been digested is taken into the system through these villi, by the blood-vessels, and other vessels termed *lacteals*.

The difference between the absorptive blood-vessels and lacteals is, that the latter have the power to collect all the digested fatty portions from the food, whilst the former have not this power.

The fluid collected by the lacteals is poured into the mesenteric glands, where it lodges for a time, and after passing through the numerous tiny cells of these glands, where it undergoes a change, it enters at last into the blood stream.

After the food has passed through the mesenteric glands, it will be found on examination to contain numerous little white bodies and fat drops.

The lacteals gradually unite, forming larger vessels, and at last empty themselves into a vessel near the lower end of the vertebræ, from which is a tube which runs up the left side of the backbone, and empties itself into the left jugular vein.

This tube is called the *thoracic duct*, and where it enters the jugular vein it has a valve which enables its contents to enter the blood-vessels, but not to flow back again.

By the time the food pulp has gone through the small intestines, and reached the cæcum, the nutritious portion, owing to the large amount of absorption which has taken place, is almost exhausted; but a large amount of absorption of water still goes on in the large intestines though no digestion. The remainder is passed on by degrees and is discharged.

Lymphatic spaces are the spaces found all over the body between the different structures. Their use is to collect the fluid part of the blood which exudes through the walls of the blood-vessels, which fluid contains food stuffs for the use of the tissues.

The fluid in the lymph spaces is called *lymph*. It is collected by the lymphatic vessels and transmitted through the lymphatic glands, and as it proceeds becomes more and more like blood, excepting in colour.

We are thus enabled to trace the passage of food materials from the mouth till they finally enter the blood system.

CHAPTER XI.

GLANDULAR SYSTEM.

THE *excretory system* consists of the lungs, kidneys and skin.

The lungs have been already described; they excrete carbonic acid gas and water, and receive oxygen.

The *kidneys* are two in number, lying at the back of the abdomen, one on each side of the upper lumbar vertebræ.

In length they measure about four inches, in width about two and a half inches, and in weight about four and a half ounces. The right kidney descends a little lower than the left, on account of the liver.

They are concave on one side, which is the side turned towards the spinal column. On this concave side there is a depression which is called the *hilum*, which is usually filled up by fatty tissue, and it is at this point the blood-vessels and nerves both enter and have free exit.

The vessels which enter and emerge from the kidney are:—

The renal artery and the renal vein. Its duct is the ureter.

The blood as it circulates through the kidneys gets rid of water and urea, and a small amount of uric acid. These waste products are then conveyed to the bladder drop by drop by means of the ureters which are the two tubes about fifteen inches in length forming the connection between the kidneys and the bladder. They enter the bladder low down and at the back.

The *bladder* is a strong bag composed of involuntary muscular fibres. It is oval in shape, and capable of being sufficiently distended to hold a pint or more of urine.

It has three openings, two already named, being the openings where the ureters enter, and the urethra, which is the outer and external opening, and from which the urine is expelled at intervals.

The normal amount of urine passed in twenty-four hours should measure about sixty ounces; but is variable, according to the amount of fluid taken, and the action of the skin.

The *skin* has very similar functions to the kidneys, of which the following are the principal:—

It forms a covering, and protects the whole of the body.

It acts as a sensory organ of touch.

It also excretes from the body a fluid called sweat, and which consists of a quantity of water, a small amount of carbonic-acid gas, and a little urea.

It also tends to keep the heat of the body even.

It has two layers, namely:—

The *epidermis* and *dermis*.

In the former, which is the outside covering, we have numberless little openings not visible to the naked eye, and which are called the *pores* or sweat glands; from these the perspiration exudes.

The epidermis contains no blood-vessels, and only very few nerves; its chief use being that of protecting the dermis or true skin.

The skin which covers the lips, inside of nostrils and eyelids is composed of mucous membrane, as in the internal organs.

The skin covering the inner side of the limbs is more sensitive than on the outer, and that on the palms of the hands and soles of the feet is much more sensitive than on other parts of the body.

The *dermis* or true skin is plentifully provided with blood-vessels and nerve fibres.

It is composed of elastic tissue, and its under surface is well supplied with fat, which is not a good heat conductor, and thus aids in keeping the body warm by preventing the outward passage of heat.

CHAPTER XII.

RESPIRATORY SYSTEM.

THE external *organs of respiration* are the nose and mouth.

Air enters through these organs into the soft part of the throat, which is called the pharynx. This organ is the common passage of the respiratory and digestive track.

From the pharynx the air enters the trachea and thence passes into the lungs. It is warmed, moistened, and loses its impurities during its passage.

The trachea enters the thorax and there divides into two branches, called the bronchial tubes, one entering into each lung.

These go on dividing, forming smaller and smaller branches, until at last they become so small as to be scarcely seen by the naked eye, and from these the air cells originate.

The inner side of these air cells has a lining of flat cells, then fibrous tissue, then elastic tissue and then capillaries, which are derived from the pulmonary arteries.

These capillaries take a twisting form, and are distributed all over the air cells.

It is here that the blood is purified, the air cells giving up a large amount of oxygen to the blood, and receiving the carbonic acid gas in exchange.

The air also gains water in the lungs, and throws off a certain amount of animal matter, and ammonia in small quantity.

The exchange taking place between the air cells and blood corpuscles is really carried on by the hæmogoblin, which is contained in the framework composing the corpuscles.

The lungs are encased within the ribs which are attached to the breast-bone in front, and the dorsal vertebræ behind, the whole forming a protecting cage.

At the inner side of the lungs we have the trachea and blood-vessels entering, while underneath lies the diaphragm.

The means by which respiration is carried on are threefold, *viz.* :—

1. By the intercostal muscles, which are attached to the walls of the thorax, and move the ribs.

2. By the diaphragm, and
3. By the elasticity of the lungs themselves.

The floor of the thorax is expanded and contracted by the expansion and contraction of the diaphragm, and a vacuum which becomes filled with air is produced by all these muscles acting as a pump.

The lungs are each encased in a double bag of membrane, which secretes a fluid called serous fluid. This membranous bag or sac is called the pleura; one side of the bag is adherent to the lungs, whilst the other lines the thoracic walls.

Tidal air is the ordinary air which is taken into the lungs in quiet respiration.

Complementary air is the inspiration of air caused by sighing.

Supplementary air is all the air that can possibly be expired from the lungs at a single expiration.

Stationary air is any air remaining after the supplementary air has been expired.

Normal respirations are from fifteen to twenty per minute; anything differing much from this is called abnormal.

PART II.

MASSAGE.

DEFINITION.

MASSAGE is the term used to express certain scientific manipulations which are performed by the hands of the operator upon the body of the patient.

It is a means used for creating energy where such has become exhausted, from whatsoever cause, and is a natural method of restoring the part either locally or generally injured to its normal condition.

It is used for various forms of ailments, such as:—

1. Hysterical wasting.
2. Nervous exhaustion.
3. Muscular atrophy.
4. Anæmia.
5. Imperfect circulation.
6. Neuralgia.
7. Constipation.
8. Insomnia.

9. Chorea.
10. Dyspepsia.
11. Liver affections.
12. Torticollis.
13. Curvature of spine.
14. Rheumatism.
15. Sprains.
16. Stiff joints.
17. Synovitis.
18. Fractures.

Some objects gained by massage are:—

1. The skin and its structures are nourished.

2. The venous and lymphatic flow are increased, and made to move more quickly through the body, forming a means by which waste material is got rid of.

3. The blood stream is also regulated, and a more even temperature of the body promoted.

4. The muscles are strengthened and made to grow.

5. Congested parts are relieved.

6. The nerves are stimulated, and their function increased.

7. Adhesions may be prevented or removed, as the case requires.

8. Reabsorption of swellings and exudations is promoted.

Its *action* is chiefly on the four following systems, *viz.* :—

The nervous.

The circulatory.

The muscular.

The bony.

The other systems are indirectly influenced by these.

The manipulations have been classified under four headings by many authorities, *viz.* :—

Effleurage.

Petrissage.

Massage à friction.

Tapotement.

The terms are derived from the French language.

EFFLEURAGE.

Under the heading of effleurage are placed all the movements of a stroking character.

It is a manipulation which applies itself more particularly to the surface, and may therefore be used on almost all parts of the body, between other movements.

Its *action* is particularly on the local blood-vessels (those which are near the surface, and not covered by muscle), causing them to dilate, thus increasing the superficial circulation.

Effleurage also acts on the skin itself and its structures, causing reflex action, and on the nerve endings.

Mode of manipulation.—The stroking should be performed in a brisk manner, with pressure towards the heart, so as to assist the circulation in its natural course, and the hands should glide along the limb, so as to keep in contact with the patient's skin. Bony projections and parts devoid of muscle should be avoided.

PETRISSAGE.

Under the heading of petrissage, or kneading, are placed all the movements in which pressure in any form is used.

This movement applies itself more particularly and is usually performed on the deeper and more fleshy portions of the body.

Its *action* is most marked on the muscular and fatty tissues, and on the deeper blood-vessels and nerve trunks.

It also is an active agent in helping on the normal secretions and excretions of the body, and on the lymphatic system, by which it gets rid of waste material by means of absorption, thus making room for the new, and it also increases the circulation.

Mode of manipulation.—This movement is mainly performed on the deeper structures, and not over bony surfaces; on such parts the lighter form of kneading may be performed with the fingers and thumbs.

The manipulations should be performed evenly, avoiding all jerks.

MASSAGE À FRICTION.

Under the heading of massage à friction are placed all the movements in which the thumbs or fingers are brought into use, more particularly where smaller pressure movements are required.

Its *action* is chiefly on bruised and swollen parts; in such cases absorption is promoted.

Practised on weakened and contracted muscles in any part of the body, it stimulates, strengthens and stretches them.

It also relieves pain and induces sleep.

Mode of manipulation.—The part to be treated is worked around with the pads of the fingers or thumbs, making pressure circles.

Massage à friction is chiefly used around joints, around the seat of pain in neuralgic cases, on the back, and any part of the body where the muscles have become contracted.

TAPOTEMENT.

Under the heading of tapotement are placed all the movements of a tapping nature.

Its *action* is chiefly on the muscles and nerves. In the former the muscles are made to contract apart from the will; and in the latter case, tapotement acts as a very strong stimulant to the nerve trunks.

Mode of manipulation.—These movements are applied to the more muscular portions of the body, and may be performed in different ways, *viz.*:—

With the hand or hands lightly closed.

With the sides of the hands.

With the tips of the fingers, or with the back or front of the fingers.

The tapping should be of a very light nature, and no force used; but with great rapidity, the movement coming chiefly from the wrist.

Vibrations are also used with massage manipulations; but are not very easy to describe in writing.

The *action* is chiefly on the internal organs, and on the nervous system.

Mode of manipulation.—The finger or fingers and hand are placed over the affected part; and the hand made to tremble or vibrate.

EXERCISING JOINTS.

The arterial and venous circulation is improved by exercising the joints, also the lymphatics and nerves connected with the joint.

The muscles are also exercised, and therefore improved, so that by this means internal massage is performed.

Exercises have also been found very useful in cases of indigestion, constipation, paralysis, rheumatism, spinal curvature, and in all cases where the patient is unable to take natural exercises.

They may be passive, active, or resistive.

Passive exercises are those performed by the masseuse in exercising joints.

Active exercises are the movements performed by the patient.

Resistive exercises are movements in which the patient resists the masseuse or *vice versâ*.

GENERAL ADVICE.

I. Keep the finger nails cut short and the hands soft. Coarse hands and skin and abrasions may be healed by first washing in warm water, and after drying with a soft towel, rubbing in a mixture of olive oil and glycerine, in equal parts.

II. Take regular meals during the day, and if possible keep one day in the week for outdoor exercise. Rest the body as much as possible between your massage cases, so as to reserve your strength, and retire to bed early.

III. Never massage a patient until your own hands are thoroughly warm, and all jewellery must be removed from the arms and fingers.

IV. Wear a loose blouse or some similar garment, and have the sleeves made so that they can be easily turned up above the elbow, which will thus prevent their touching the patient's skin, and so avoid a cause of irritation.

V. The breath must also be kept from blowing in the patient's face or on her body.

VI. Keep calm and do not fuss, or talk unnecessarily. Fatigue will thus be saved on both sides, and gossip avoided.

VII. Don't apply any movement which is absolutely disagreeable to a patient at first. She will doubtless allow and enjoy all as she regains strength and becomes accustomed to the hands of the operator.

VIII. After a meal always allow from one and a half to two hours to elapse before manipulating, so that the process of digestion may not be interfered with.

IX. Immediately after manipulations some light nourishment may be administered, such as milk, egg-flip, beef-tea, etc., and the patient allowed to rest for one hour, that is if she has been in the habit of getting up.

X. Do not perform massage in a cold room. The temperature should be at least 65° F.

XI. Have the patient attired in a dressing-gown, or some suitable garment, and then wrapped in a blanket. Only expose the particular part of the body on which you are manipulating and cover when massaged, having previously prepared a hot-water bag or jar, protected by flannel cover, to place beside the patient. This may be omitted if the patient objects.

XII. The order in which general massage is usually performed is—beginning at the toes, working up from joint to joint, until the hip is reached, then the upper limbs in the same order, then the chest, and lastly the back.

XIII. *Lubricants* and *powders*, as a general rule, are not necessary, and should be avoided. They clog the pores of the skin, and in some degree prevent the electricity from the hands of the operator entering the patient.

A lubricant may be applied with good result after manipulating a part, as it then helps to maintain the heat, which has already been created.

The part should then be covered with wool, or a shawl.

XIV. In some cases, however, it is essential that a lubricant be used from the first. In general cases lanoline cream is best—if the patient can afford the expense—as it is an animal fat.

Lubricants may also be used when the skin is *rough* or *hairy*, if the *patient be very thin*, in cases of *very young children*, and *after removal of splints*, to prevent particles of skin flying about.

In cases of *moist skin* the application of a little oatmeal powder is advised.

In cases of *constipation* a lubricant should be used freely, and for the purpose castor oil has been strongly recommended, though, if disagreeable to the patient, almond oil is a very good substitute.

XV. In cases of *neuralgia*, *painful* or *stiff joints*, always employ a lubricant. If no special one be ordered use one of the following:—

(*a*) Castor oil and chloroform, equal parts. The former being very penetrating, while the latter deadens the pain.

(*b*) Potassium iodide liniment, the hands being first immersed in hot water.

XVI. Do not interfere with the joints during the first or inflammatory stage of any inflammation, and watch for the slightest rise of temperature, as under such circumstances neither local nor general massage should be performed.

XVII. The chief requirements at first are rest and some soothing application, either hot or cold, whichever the patient prefers.

XVIII. Massage and exercises when applied at the right time will prevent the effused blood from becoming organised, and will promote absorption.

XIX. If possible the manipulations for such parts should be performed in the morning.

XX. Remember always and in all cases to begin working above the joint, so as to remove any blocking which may have taken place in the blood-vessels and lymphatics.

XXI. If massage be ordered for a patient suffering from heart disease, the pulse and respiration should be watched, and massage be discontinued if the least sign of weakness occurs.

Stimulants when necessary should be given in small quantities, diluted with water. Such should be placed in a handy position, so as to be easily got at if required.

A small basin should also be in readiness in case vomiting occurs, and a piece of flannel for fomentation to place over the region of the heart if necessary.

There should also be a kettle of water boiling in the room for the fomentation, or in case an extra supply of hot bottles be required.

XXII. Always massage with the patient's and your own muscles well relaxed.

ORDER OF MOVEMENTS FOR GENERAL MASSAGE OF THE BODY.

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Foot :—

1. Rolling and exercising toes.
2. Deep kneading with ball of thumb and heel of hand to sole of foot.
3. Deep kneading with ball of thumb to inner and outer sides of heel.
4. Counter friction to top of foot.
5. Deep strokes between metatarsal bones.
6. Stroking with finger pads round ankle.
7. Exercise foot.

Foreleg :—

1. Deep strokes to Archilles tendon.
2. Stroke with both hands from ankle to knee.
3. Knead flexor muscles with thumbs.
4. Knead inner and outer calf muscles.
5. Claquement.
6. Rolling up.

Knee :—

1. Hand-crossing over knee.
2. Thumb-crossing round patella.

3. Friction with finger pads under knee.
4. Knead with thumbs on top.
5. Round rubbing to sides.
6. Exercising joint.

Thigh:—

1. Stroke underneath and top of thigh with both hands.
2. Deep kneading all over.
3. Deep strokes.
4. Hand-crossing.
5. Chop-sticks. }
6. Claquement. } Tapotement movements.
7. Round rubbing.
8. Rolling up.
9. Exercise joint.

Upper Extremity.

Hand:—

1. Rolling and exercising fingers.
2. Knead deeply palm of hand and ball of thumb.
3. Counter friction to hand.
4. Deep strokes between metacarpal bones.
5. Knead *wrist* with thumbs on top and fingers underneath.
6. Exercise joint.

Forearm :—

1. Stroke inner side of arm.
2. Stroke outer side of arm.
3. Deep strokes.
4. Counter friction.

Elbow :—

1. Counter friction with thumbs to joint in front with arm flexed.

2. Circular friction with finger pads underneath with arm extended.

3. Round rubbing to sides.

4. Exercise joint.

Upper arm :—

1. Stroke inner side.
2. Stroke outer side.
3. Knead all round.
4. Knead deltoid muscle.
5. Claquement. } From wrist to shoulder.
6. Rolling up. }
7. Exercise shoulder.

Neck (front) :—

1. Stroke.
2. Knead.

Chest :—

1. Roll chest muscle.
2. T. movement.
3. V. movement.
4. Roll and stroke breasts, if necessary.

Abdomen :—

1. Roll and stroke below bosom and over stomach region.
2. Roll and stroke over region of liver.
3. Breathing exercise.
4. Circular friction, beginning round umbilicus, and enlarging the circle by degrees.
5. Deep kneading.
6. Superficial kneading.
7. Tapotement.
8. Muscle turning.
9. Stroke recti muscles.
10. Rolling.

Back of neck :—

1. Stroke.
2. Knead.
3. Thumb circles on either side of cervical vertebræ.

Spinal column :—

1. General stroking of back.
2. Stroke from nape of neck to end of spine.

3. Stroke with two fingers.
4. Stroke with both hands.

(These are the large general movements for back, and should be performed before the movements for sleeplessness and paralysis.)

5. Pincement.
6. Outward rubbing of fingers.
7. Thumb circles.

On each side of spine (dorsal region):—

1. Roll.
2. Knead.
3. Iron.
4. Tapotement.
5. Friction across back with flexor part of arm.

Lumbar region:—

1. Hand-crossing.
2. Repeat above dorsal moves.
3. Friction with ulnar border of hands.

(For anæmia of brain, all movements are performed from sacrum to nape of neck.)

MOVEMENTS FOR FACIAL PARALYSIS.

Place two fingers inside the cheek, previously covered by a clean pocket-handkerchief.

1. Circular friction with finger pads from chin to above eyebrow.

2. Firm kneading all over with fingers and thumb.
3. Tapotement.
4. Muscle turning.
5. Circular friction round mouth and eye.

(If lubricant be applied *after* manipulations, the following one may be employed—Brandy and olive oil, 1-3 mixture.)

ORDER OF MOVEMENTS FOR WRITER'S CRAMP.

Hand:—

1. Knead heart of hand and ball of thumb very deeply.
2. Small kneading.
3. Circular friction with three fingers in palm of hand.
4. Friction and extension of fingers.
5. Knead wrist.

Forearm:—

1. Stroke inner side of arm as far as elbow.
2. Stroke outer side of arm as far as elbow.
3. Deep strokes.
4. Counter friction.
5. Flick both sides.
6. Circular friction with finger pads.

Elbow :—

1. Counter friction to elbow in front, with arm flexed.
2. Circular friction underneath with arm extended.
3. Round rubbing to sides.

Upper arm :—

1. Stroke inner side.
2. Stroke outer side.
3. Knead all round.
4. Knead deltoid muscle.
5. Tapotement.
6. Round rubbing. } From wrist to shoulder.
7. Rolling up.

Neck and shoulder :—

1. Stroke back of neck on affected side, out towards shoulder.
2. Knead with heel of hand in same direction.
3. Circular friction with finger pads over the same part.
4. Tapotement.

These movements are performed over the nerves forming the brachial plexus, as it is from

this part that the nerve trunks for the arm proceed.

Only passive movements should be performed at first, and later on resistive.

Complete rest should be given to the flexor muscles of the arm; by the occupation which caused the cramp being discontinued.

Movements for Sleeplessness.

All preparations for the night should be made, so as to prevent the patient being disturbed when the movements are commenced.

If the patient suffers from cold feet, massage should be given to lower extremities.

After performing spinal movements, the gas should be lowered, and the masseuse stand at the head of the bed—if possible—where she will not be observed by the patient.

No exciting movements should be applied at night, and exercises omitted.

1. Perform the large general movements of the back, *viz.* :—

Stroking with both hands over surface of back.

Stroke spine with one hand.

Stroke spine with two fingers one on each side of spine.

Stroke with two hands, one hand following the other in rapid succession down the back.

2. Circular friction on each temple, over eyebrows and below eyes.

3. Gentle friction across forehead from temple to temple, keeping the palm of the hand in good contact all the time.

4. Gentle rubbing of fingers through the hair, if agreeable to the patient.

5. Slow, gentle pressure with thumbs over eyeballs, with the patient's eyes closed.

If the last movement be done for *tired eyes* only, the pressure should be very light at first, and gradually increased as desired by the patient, in an outward direction.

MOVEMENTS FOR NEURALGIA.

1. Make pressure with thumb pad on supra-orbital nerve, which sometimes cures the pain. If patient is not relieved, the movements should be made over seat of pain, working in an outward direction, from the bridge of nose towards temple, on the affected side.

All movements should be firmly applied.

If the whole head be affected, use :—

2. Firm pressure with thumbs, working up

from the bridge of the nose, and moving in opposite directions.

3. Thumb-screw pressure round seat of pain in same direction.

4. Tapotement movement all over forehead and head.

5. Very firm pressure with fingers to scalp.

6. Pressure with fingers over forehead, gliding lightly down cheek bones, well up behind the ears, and firmly down on shoulder muscles.

MOVEMENTS FOR WRY NECK.

1. Stroke neck and upper part of back.
2. Knead with fingers and thumb.
3. Circular friction with finger pads.
4. Stripe each muscle, particularly the sterno-mastoid, with a succession of three small strokes and one long one.
5. Exercise head.

If the case be severe, so that the chest and shoulder muscles become affected, massage for these parts should also be performed.

MOVEMENTS FOR SPEAKER'S SORE THROAT.

1. Stroke well round neck and behind ear.
2. Knead with fingers and thumb.
3. Stripe each muscle separately.

4. Place first fingers and thumbs—separated—well up under the lower jaw, and stroke the throat crosswise with the pads of thumbs.

The patient should be told to gargle with salt and water three times daily, the solution being in the proportion of one teaspoonful of salt to ten ounces of warm water.

Complete rest should also be given, no public speaking allowed, and chills avoided.

MOVEMENTS FOR INDIGESTION.

1. Stroking movement around neck and down œsophagus.
2. V. movement.
3. Liver and stomach movements always to be done, and movements for constipation when necessary.

MOVEMENTS FOR LIVER AFFECTIONS.

1. Rolling over region of liver in front and at the back.
2. Firm deep kneading.
3. Deep strokes.
4. Tapotement.
5. Vibrations to liver and gall bladder.
6. Friction.

MOVEMENTS FOR CONSTIPATION.

Before starting manipulations for abdomen, see that the bladder is empty.

Raise the head and chest, flex the legs, and place a pillow underneath the knees to support them.

The patient is placed in this position in order to relax the abdominal muscles as much as possible. Be sure and tell the patient she will be hurt if she stiffens herself.

All movements should be made from right to left, so as to help nature in its course, and a lubricant should be used freely.

1. Breathing exercise—exercises diaphragm.

2. Circular friction beginning at umbilicus, widening the circle by degrees, and whilst doing so make observations.

Notice if there be any hard parts or tender spots.

3. Work well into splenic flexure, and along the course of descending colon, as there is more blocking at this part as a rule.

4. Firm pressure all round colon, moving the fingers in a rotatory manner.

5. Corkscrew movement helps to break up fæcal matter.

6. Press all round colon.

7. Vibrate gall bladder. The gall bladder is vibrated to cause the bile to flow more freely, thus removing a possible cause of constipation.

8. Knead and vibrate small intestines.

9. Knead abdominal muscles.

10. Tapotement.

11. Muscle turning.

12. Stroke recti muscles.

13. Friction all over, fingers pointing downwards, so as not to catch in the ribs.

14. Bracing up movement.

15. Exercise lower limbs, flexing the thigh well over the abdomen, and rotate each leg about twelve times each way.

These exercises move the muscles which lie at the back of the colon, *viz.*, the psoas magnus and iliacus.)

Then grasp the foot firmly and tell the patient to resist your pressure upwards.

16. Turn the patient over and give deeper massage to gluteal region, and at the back of sacrum, using also deep muscle pounding.

17. Work well into loins on each side, unless ordered not to do so.

18. Tell the patient to do some simple exer-

cises in the morning that will work on the abdominal muscles, such as:—

Hands placed firmly on hips, knees straight, bending of the trunk forward, backward, lateral movements and rotation.

She should also be advised to drink a tumbler of water before breakfast and at intervals during the day.

Stewed fruit and baked apples will also be found of great use in correcting habitual constipation.

MOVEMENTS FOR CHRONIC DIARRHŒA.

The same manipulations may be employed as those used in cases of constipation; but they must be very lightly performed.

MOVEMENTS FOR RETENTION OF URINE.

1. Deep massage applied to lumbar region.
2. Firm stroking of recti muscles.
3. Vibrate over bladder region.

These movements should not be attempted if the patient is suffering from kidney disease, unless ordered to do so.

MOVEMENTS FOR RHEUMATIC SHOULDER.

1. Counter friction all over shoulder.
2. Sawing movement under scapula.

3. Kneading all over trapezius and deltoid muscles.
4. Ironing.
5. Tapotement.
6. Rolling muscle.
7. Circular friction with finger pads under axilla, with towel placed between the patient's skin and operator's fingers.
8. Exercise shoulder joint.
9. Chest massage is also to be done.

Movements for Stiff Knee Joints, etc.

1. Massage should first be applied to neighbouring muscles, beginning above the joint.
2. General massage of knee.
3. Ironing movement.
4. Exercise, at a suitable time.

Movements for Dilated Veins.

Veins should never be touched when in a very varicose condition, as it is dangerous, and in any case they would be made worse.

There is a stage, however, when doctors sometimes order massage, and the manipulations employed are those which help to get rid of the blocking, promote absorption, and will help the heart in pushing on the venous flow.

If possible massage the limb or limbs—as the case may be—with the legs raised, and cause the patient to rest in a similar position several times daily for as long as possible, so as to relieve the weakened veins. Use plenty of oil.

Should a vein burst in spite of precautions taken, apply pressure, by placing a penny, covered with a clean piece of lint or linen over the wound, and bandage firmly until assistance can be had.

The patient's legs will already have been raised, the head lowered, and usual restoratives administered.

MOVEMENTS FOR RECENT SPRAINED ANKLE.

1. Stroke above ankle over knee.
2. Very gentle stroking from toes, gliding up leg.
3. Very gentle circular friction round ankles.
4. Stroke outer sides of foot and back of ankle with ulnar border of hands.
5. Place right hand on top of foot, left hand behind the heel, raise the foot, and stroke the Achilles tendon, and replace the right hand on top of the foot before putting it on the bed again, so as to avoid any jar.
6. Stroke above ankle.

7. The exercises for the toes and foot may usually be performed after the first couple of days of massage.

Always extend the foot first, as it is usually less painful, then give flexion, and afterwards only the movement which is least painful to the patient.

Adduction should be performed first in a case of inward sprain, as the outer side will be the more painful and swollen.

Abduction is given first in an outward sprain for the same reason.

MOVEMENTS FOR SYNOVITIS.

1. Stroke above knee.

2. Knead above knee.

3. Pressure with ulnar border of hand on the edge of the swelling.

4. Stroke above knee.

5. Place hands about six inches apart, and bring gradually together, until the outer border of the swelling is reached. Then use pressure and counter pressure, if the patient can bear it.

6. Raise knee gently, and give deep petrissage underneath, and stroke upwards, and after replacing leg very gently stroke above knee.

7. General massage to knee is applied at a suitable time.

MOVEMENTS FOR RECENT FRACTURES.

Fracture near Ankle.

First day of Massage:

Great care to be taken not to move or shake the leg in the least degree.

Observe how the splints are fastened, so as to leave them in the exact position in which the surgeon placed them.

1. Unfasten splints, leave them carefully on each side, and give smooth upward stroking with one hand, whilst the other steadies the patella.

The object aimed at by this movement is:—

To relieve muscular spasm.

To promote rapid absorption of effused blood.

The time employed is generally from five to ten minutes.

2. Any time after the *second day*, the first day's movements are performed, adding flexion and extension of toes.

These manipulations perform internal massage, the object being to prevent the formation of adhesions.

Time five to ten minutes.

3. Any time *between* the *fourth* and *eighth* days the foot bandage is removed, the fracture steadied with left hand, and flexion and extension of foot performed to prevent formation of adhesions.

4. Any time after the *fourteenth day* all splints are removed, and complete general massage for fifteen minutes given to limb.

5. Then strap on two short side splints one on each side of fracture, and give flexion and extension of knee joint.

Fractured Patella.

The fractured portions should be held together with the fingers and thumb of left hand whilst the manipulations are performed with the other. If this precaution be not taken, the fractured portions are likely to be separated when the upper leg is being stroked.

The patella is moved at a suitable moment, in order to prevent it becoming adherent to the femur.

SPINAL CURVATURES.

There are three special forms of spinal curvature, *viz.*:—

Kyphosis.

Lordosis.

Scoliosis, or lateral curvature.

The two former are alterations in the normal curves and are called angular curves.

If the bone is diseased massage should not be performed.

Kyphosis is a posterior curve in the dorsal region.

General massage of the back and chest may be done, and exercises to bring back shoulder blade and expand chest, such as arm flinging and breathing exercises.

Lordosis is an anterior curve in the dorsal region or lumbar region. Patient is often pigeon-breasted. It may be caused by rickets.

General massage of the back, and exercises to act on abdominal muscles and flexors of thighs, also hanging on trapezius muscles, if the wrists be sufficiently strong enough.

Scoliosis, or *lateral curvature*, means a leaning of the spine to one side or other, and may begin in the dorsal region to right or left.

A *typical case* is curve to the right—this is called a *primary curve*; but if the patient is not cured by treatment, in time a *secondary curve* occurs in the lumbar region in the opposite direction.

This secondary curve is called a compensatory curve, and forms an S curve; but sometimes one big curve occurs, and it is then called right or left C curve.

If *rotation of the vertebræ* takes place, we get protruding ribs on the convex side of curve, ribs sunken in on concave side.

High shoulder on convex side of curve, also the pelvis thrown up on the same side.

Protruding hip on the opposite side to dorsal convexity.

Contracted muscles on the concave sides, stretched muscles on the convex sides.

MOVEMENTS FOR SPINAL CURVATURE.

Position of patient:—

Arm on high shoulder placed close to side.

Arm on low shoulder placed above head.

Small pads to be placed under sunken-in parts, so as to make the back as level as possible.

1. General massage for back of neck.
2. Stroke over back with both hands.
3. Roll on convex side of curve, towards the spine, one hand supporting the protruding hip on the opposite side.
4. Roll towards the lumbar convexity, one hand supporting the dorsal convexity.

5. Petrissage on concave sides of curves.

6. Ironing movement with pressure towards the spine on the convex sides of curves, away from the spine on the concave sides.

7. Tapotement on the convex sides of curves only, on the stretched muscles.

8. Work with finger pads in circles on the concave sides of spine, in order to stretch the contracted muscles, at the same time steady the spine on the convex side, to prevent further rotation.

9. Ordinary movements about the spine following the curve.

10. Push up the low shoulder, pull down the high one.

11. Give general massage to loins and buttocks.

EXERCISES TO BE DONE.

Patient to lie flat on back, arms stretched by the side, hands supine.

1. Take slow full inspirations by the nose, slow expirations by the mouth.

2. Same movement with arm stretched above the head, ten times each.

3. Arm circumduction, twelve times in same position.

4. Hips firm position, extend leg, and circumduct each twelve times.

The patient should be made to lie flat on the back for an hour after the massage, and at intervals during the day.

Faulty positions in sitting and standing should be corrected, and no unequal weight allowed on the muscles of the back.

MOVEMENTS FOR SCIATICA.

1. General massage of toes and foot.
2. Deep strokes to Achilles tendon.
3. Stroke foreleg.
4. Knead inner and outer calf muscles.
5. Circular friction with finger pads, working deeply up the back of the leg, and paying attention to any little knotty portions.
6. Claquement, if the patient can bear it.
7. Rolling up.
8. Stroking off.
9. General massage for knee.
10. Stroke thigh, both back and front.
11. Knead all over.
12. Circular friction with finger pads, working deeply into the sciatic nerve, if the patient can bear it.
13. Tapotement.

14. Rolling up.

15. Stroking off.

(Turn the patient on her side, if she is not already in that position.)

16. Roll, knead and apply circular friction with finger pads to lumbar region, working out from the spine.

17. Give general massage to buttocks.

18. Knead deeply, same region, with heel of hand and thumb.

19. Stroke from knee towards hip.

20. Deep kneading with base of thumb along the course of nerve.

21. Kneading with both hands.

22. Claw strokes.

23. Tapotement movements along the course of sciatic nerve, with the fold of a blanket between the patient's leg and hand of operator.

24. Stroke with flexor side of arm along the course of nerve.

25. Stretch the nerve.

The massage should be performed in the most comfortable position to the patient, and if there be much tenderness along the nerve, the masseuse must leave it severely alone, and work on either side.

The region of the buttock is usually very pain-

ful to the touch, but sometimes pressure circles give considerable relief.

General massage is given at a suitable time, and exercises to joints as soon as the patient can bear them.

THE WEIR-MITCHELL OR "REST-CURE" TREATMENT.

The Weir-Mitchell treatment is so called because first introduced by a doctor of the name, and consists of:—

Isolation.

Rest.

Over-feeding.

Massage and electricity.

The period of treatment varies from six weeks to three months.

At first the patient is *isolated* from her friends, which means that no communication is allowed, not even by letters.

The only visitors, apart from the nurse, being the doctor and the masseuse.

The *rest* consists of the patient being put to bed and kept there, and not being allowed to do anything for herself at first.

Daily bathing and feeding are performed for her by the nurse, who at the end of a fortnight may read to her, if allowed.

The *feeding* of the patient forms a very important part of the treatment, which varies according to the condition of the patient and the doctor's plans, which will of course be carried out by the nurse.

Generally speaking, it consists at first of milk being taken hourly, about five ounces, which is alternated with other forms of light nourishment, until three full meals are also added daily.

It is advisable to give these patients black coffee in the early morning, so as to prevent constipation occurring.

Massage and *electricity* are given twice daily for twenty minutes, and gradually increased until one hour and a quarter is given twice daily, this being about the end of the second week. Towards the end of the treatment the massage is gradually decreased, until it is given only three times a week, as the patient is then allowed to exercise herself.

The object of massage in such cases is to perform exercises for the patient's body without causing her any fatigue.

It should therefore be given vigorously in order to prevent any ill effects which might occur from the rest and over-feeding.

Special attention should be given to the liver and abdominal massage so as to prevent constipation occurring.

SPECIMEN EXAMINATION QUESTIONS ON ANATOMY AND PHYSIOLOGY.

1. Describe the femur and scapula.

2. What is the difference between ligaments and tendons?

3. Describe the shoulder-joint.

4. Give origin, insertion and action of the following muscles:—

   Biceps, soleus, supinator brevis, gluteals.

5. Describe the liver.

6. Trace the course of the median nerve.

7. Explain the following:—

   Pons varolii, voluntary and involuntary muscles, tarsal, chyle, villi and synovial membrane.

8. Describe the vertebral column.

9. Of what does a joint consist?

10. Give origin, insertion and action of the following muscles:—

    Latissimus dorsi, diaphragm, gastrocnemius, triceps, obliquus externus and supinator longus.

11. Describe the knee-joint.

12. Explain the following:—
Sarcolemma, bursæ, afferent and efferent. tone of muscles, pia mater. cauda equina.

13. Describe the mechanism of pronation and supination of the hand.

14. Describe the position and function of the kidneys.

15. Describe the latissimus dorsi as fully as you can.

16. Give position, origin and insertion and action of the Tibialis anticus.

17. Where is the colon? Describe its course.

18. Describe the hip joint.

19. What do you know of the organs of digestion?

20. Give the origin, insertion and action of the deltoid muscle.

21. Describe briefly the circulation of the blood.

22. What is meant by the ham-strings?

23. Enumerate the muscles that move the forearm.

24. Describe the wrist-joint.

25. What are the muscles?

26. Trace the course of the sciatic nerve.

27. Describe the ankle-joint.

28. Give origin, insertion and action of the following muscles:—

    Supra- and infra-spinatus, Teres minor and major, Pectoralis major.

29. Describe the mechanism of respiration.

30. Describe the pelvis.

SPECIMEN EXAMINATION QUESTIONS ON MASSAGE.

1. Name the different terms used in massage and explain their object.

2. How would you massage for constipation ?

3. How would you apply massage in old fractures ?

4. In cases of abdominal massage, what points would you specially note, and what precautions would you take ?

5. How would you give massage for neuralgia of the head ?

6. How does massage restore wasted muscles ?

7. How would you rub a sprained ankle ?

8. Describe the area you would leave untouched, should you be told to avoid the kidneys.

9. What rules in life should a masseuse observe in order to carry out her arduous duties efficiently, and preserve her moral and bodily health ?

10. How would you apply massage in a case of insomnia ?

11. What special precautions are necessary in massaging a case of recent fracture?

12. What are the best lubricants for massage, and for what cases are they used?

13. State some effects of massage and the reason for thinking it agrees with a patient, or on the contrary.

14. How would you rub for wry neck?

15. Doctor orders massage for liver—describe when and how you would rub.

16. Describe the appearance in a case of lateral curvature. What points will you specially note?

17. How would you prepare a patient and bed for general massage, and what points would you attend to before leaving?

18. What do you understand by "Weir-Mitchell" treatment? Give a diet.

19. What effect has massage on the skin and kidneys?

20. How does massage affect contracted tissues, and how should it be applied?

21. What points usually require most attention in massage of a "Rest-cure" case?

22. In rubbing a case of rheumatoid arthritis, what precautions will you use?

23. When and why is deep muscle kneading necessary?

24. How would you rub for sciatica?

25. How would you rub for synovitis?

26. Name some cases in which massage should not be performed.

27. How would you rub recent fractures?

28. How would you rub for rheumatic shoulder?

29. Why are joints exercised in cases of massage?

30. How would you massage for writer's cramp?

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